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JUN 25 1999

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

June 25, 1999

Ms. Magalie Roman Salas
Secretary
Federal Communications Commission
445 – 12th Street, SW, TW-A325
Washington, DC 20554

RE: Long Term Number Portability Tariff Filings of U S WEST Communications, Transmittal Nos. 965 and 975, CC Docket No. 99-35

Dear Ms. Salas:

On June 24, 1999, representatives of U S WEST met with Chris Barnekov and Josephine Simmons of the Competitive Pricing Division. The undersigned attended this meeting in person. Bill Johnston and Jim Hannon, of U S WEST, participated via telephone. At this meeting we reviewed previous submissions of U S WEST in the above-referenced proceeding. We also discussed material filed by U S WEST in this proceeding that day under separate cover. Copies of the attached material were also provided to Mr. Barnekov and Ms. Simmons at this meeting.

In accordance with Section 1.1206(a)(2) of the Commission's rules, an original and one copy of this letter and attachment are being filed with your office for inclusion in the public record.

Acknowledgment and date of receipt of this submission are requested. A duplicate of this letter is attached for this purpose.

Please call if you have any questions on this matter.

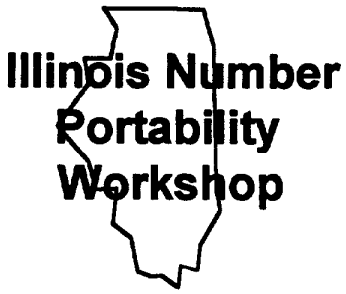
Sincerely,

Elridge Stafford

Attachment

Copy w/ Attachment: Mr. Chris Barnekov
Ms. Josephine Simmons

No. of Copies rec'd 0+1
List A B C D E



Generic Requirements
Issue 0.99, Final Draft
January 6, 1997

Generic Requirements for SCP Application and GTT Function for Number Portability

** FINAL DRAFT **

Changes since version 0.95 underlined and footnoted.
Changes since version 0.31 footnoted only.

Editor: W. Heinmiller - Ameritech

1. GUIDE TO DOCUMENT

1.1. Scope

This document addresses Local Number Portability (LNP) for the State of Illinois. The requirements within this document have been defined by the participants of the Illinois Commerce Commission (ICC) Workshop on Local Number Portability (LNP). These requirements are the necessary capabilities and functions which must be performed by a Service Control Point (SCP) LNP Application and a LNP Global Title Translation (GTT) Function in support of the initial Local Number Portability service for Illinois. A carrier may have additional requirements for their SCP LNP Application and LNP GTT Function which are beyond the scope of this document. Items not addressed by this document are left to be defined by the service provider and vendor.[1] Additional assumptions and limitations are detailed in Section 1.3.

The requirements identified in this document are highly dependent on the service provider's network architecture and network capabilities. They are based upon typical capabilities and architectures which are reasonable to assume for public switched telephony networks (PSTNs). They may be inappropriate for highly unique network architectures. It is the responsibility of the service provider to determine the applicability of these requirements for their network. It is also the responsibility of the service provider to identify any additional or different requirements to their vendors.

The term SCP is used in this document in a generic sense to imply an element in the network that runs the LNP application. It does not imply that any specific platform requirements (e.g., Bellcore's SCP requirements, GR-1280-CORE) must be met, other than what is explicitly specified in this document. Specific platform requirements are left to the service provider and vendor to define.[2]

1.2. Overview

This Generic Requirements (GR) document defines the SCP Local Number Portability (LNP) Application requirements for the LNP - Location Routing Number (LRN) Method feature. The document also defines LNP Global Title Translation (GTT) function which must exist in a network that supports LNP to properly route SS7 messages that had previously relied on simple six digit (NPA-NXX) GTT routing. The LNP GTT function may be provided by an SCP that also provides the LNP Application, or the LNP GTT function may reside elsewhere in the network.

Number Portability is a circuit switched network capability that allows a user served by one switch (the "donor switch") to move their service to a different switch (the "new" or "recipient" switch) while retaining their public directory number. Other users can call the ported subscriber without any changes to their dialing procedures. Requirements provided in this document address

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[1] Issue #26 (items not addressed by document left to service provider & vendor to define)

[2] Errata list Item #2 (Errata List revised October 22, 1996)

Number Portability using the LRN to identify the Recipient switch when numbers get ported. This document does not address LNP for subscribers with directory numbers that are also used for packet switched data.

Information about ported subscribers will be made available to SCPs supporting the LNP Application from the Number Portability Administration Center (NPAC). The LNP GTT function will also receive information about ported subscribers from the NPAC. The LNP SCP and LNP GTT are expected to be supported by a local SMS function that provides the interface to the NPAC. The local SMS function supports a vendor's SCP LNP Application, and/or a vendor's LNP GTT function, and possibly other internal processes of the service provider. As such, the requirements for the local SMS are to be determined by the vendor and the service provider, and are not addressed by this document.[3] This local SMS function may be part of the SCP LNP Application and LNP GTT function, or may reside elsewhere. A single local SMS may support multiple LNP SCPs and/or LNP GTT functions. A provider may also use more than one local SMS to serve a given LNP SCP or LNP GTT function, in order to provide greater reliability. Specific configurations between local SMS systems, LNP SCPs, and LNP GTT functions are up to each individual service provider and their vendors. The following diagram shows some of the ways in which the NPAC may connect to different service providers. For purposes of this document, a reference to the SCP LNP Application or LNP GTT Function includes the appropriate supporting SMS function.

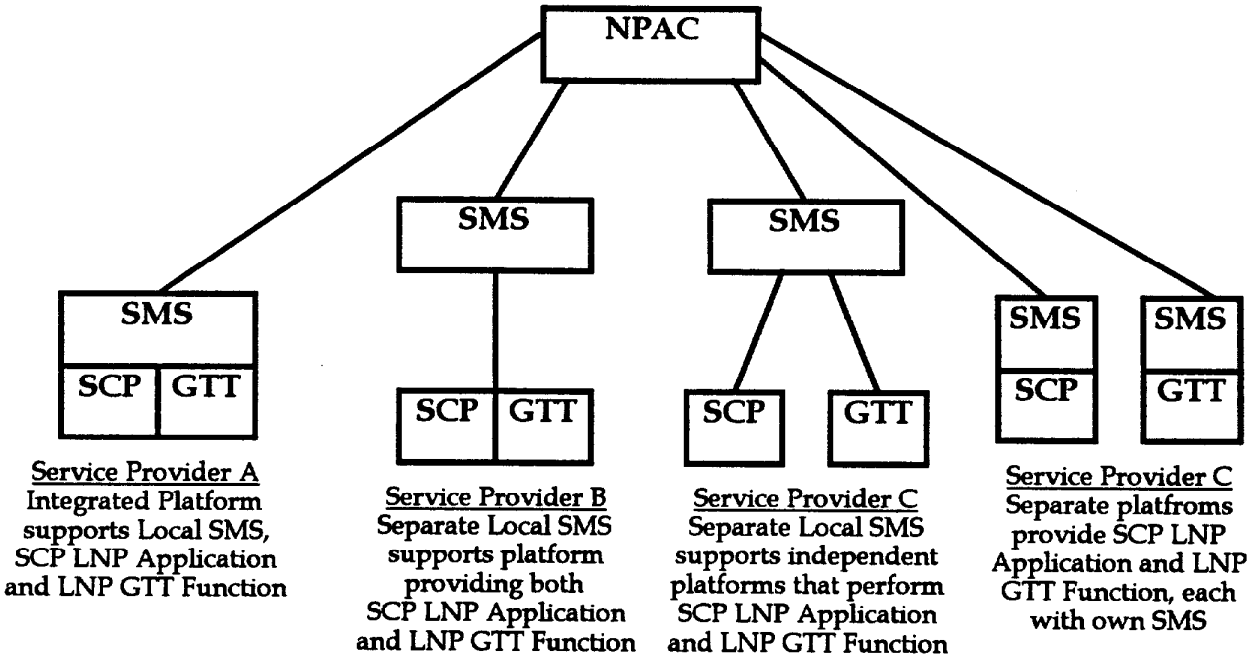

Figure 1 - Diagram Showing Some Possible Relationships between NPAC ("NPAC"), Local SMS ("SMS"), SCP LNP Application ("SCP") and LNP GTT Function ("GTT").

When an SCP supporting the LNP Application receives an LNP Query, it will respond with

[3] From Issue #17 (Local SMS functions)

appropriate information, based on stored information about ported users. The type of response will vary depending on the type of query received.

This document also defines procedures for Signaling System #7 (SS7) Global Title Translation (GTT) functions which may be used to support services that use SS7 signaling and are impacted by LNP. The GTT procedures can be used to accurately route messages for various services to the appropriate network elements (e.g., the current service switch or SCP application), when an NPA-NXX of a dialed number no longer uniquely identifies the targeted network element. The GTT procedures to support LNP can be implemented in systems other than the LNP SCP. The GTT function to support LNP can be independent of the SCP LNP Application. (Note: The LNP GTT function may only be needed when services that rely upon SS7 signaling are to be supported between networks, [4]or whenever more than one switch supports a given NPA-NXX.. The support of services between two networks is dependent on bilateral business agreements.)

This document provides the SCP LNP Application and LNP GTT function requirements for Service Provider and Location portability within a rate center. Number portability beyond a rate center and Service portability is beyond the scope of this document and is *for further study.*

1.3. Assumptions[5]

General Items

1) This feature is limited to circuit switched calls. Customers with DNs that are used for both voice and packet data can not be ported. This feature does not support packet data calls.
2) This document does not address any requirements for porting from wire-line to wireless or visa versa.
3) This document addresses the necessary requirements for location portability and service provider portability within a rate center. Service portability is not explicitly addressed by this document.
4) It is assumed that Number Portability will not be "flash cut" into a network(s).
5) Ported numbers that become vacant will be returned to the donor switch.
6) These requirements do not address any issues, including billing issues, associated with identifying multiple service providers which may use the same switch.
7) Systems that support LNP queries or the LNP GTT function, along with their supporting local SMS, must be able to support NPA splits. (Note: The NPAC system will not download data changes due to NPA splits. Updates to records affected by an NPA split must be performed by the service provider's systems. Also, the SCP LNP application and the GTT function must be able to support both old and new NPAs during permissive dialing periods.)[6]

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[4] Errata list Item #3 (Errata List revised October 22, 1996)

[5] Items renumbered due to addition of #7.

[6] Errata list Item #4 (Errata List revised October 22, 1996), revised based on NPAC process for NPA splits

Local Routing Number (LRN)

8) Each switch is expected to have at least one NPA-NXX that is "homed" to the switch (assigned in the LERG) and the LRN for the switch can consist of a ten digit number with this NPA-NXX. This may be an existing NPA-NXX or newly assigned NPA-NXX to the switch.
9) Only one NPA-NXX is needed as an LRN per LATA to identify the switch.
10) LRNs may also be DNs assigned to customers and these DNs may also be portable.
11) The LRN is a ten digit value. The first six digits of the LRN will be compatible with an NPA-NXX format. The first six digits of the LRN can be used to identify the facilities based service provider for a ported customer.

Systems that make LNP Queries

12) Switches from which numbers have been ported ("donor" switches) must be configured to perform LNP queries for calls to those DNs which have not encountered LNP triggers in previous portions of the call path.
13) Operator destined calls will not encounter an LNP trigger in the originating end office. The call will be routed to the appropriate operator service without LNP modification.
14) If a donor switch receives a call with the FCI set (indicates that an LNP query has been performed) for a number that is no longer served by the switch, the donor switch does not need to re-query for the call. If providers do not update their SCPs in a timely fashion, calls to recently ported numbers may fail (SCPs may be locked out from updating during upgrades, etc.). The donor switch does not have the responsibility for correcting mis-routed calls that occur during changes of service providers or locations.
15) The LNP queries can be done using both AIN and the IN protocol. For AIN, the trigger that generates the query can be PODP-like. A switch need only support one LNP trigger type; PODP-like, or IN-like.

General Items about Platforms supporting LNP Queries

16) An SCP only needs to support the types of LNP queries that are generated by the switches served by that SCP. Similarly, an SCP only needs to support the LNP responses recognized by the switches served by that SCP.
17) Nothing in this document restricts the SCP from running other applications in addition to the LNP Application described by this document, including other LNP applications.
18) These requirements make no assumptions about the deployed architecture of the SCPs which provide the LNP Application, or the method by which the SCPs are connected to the SS7 network. SCPs may be deployed in simplex, mated/duplex, N+1, or any other configuration, and can be connected to the SS7 network using simplex or duplex/mated STPs. Selecting an appropriate network architecture is an exercise for each carrier, based on their requirements for reliability, survivability, performance under failure conditions, etc. At a minimum, the architecture must meet the availability and delay requirements in Section 4.10.
19) These requirements make no assumptions about the SCP software or hardware

platform which supports the LNP Application.

20) These requirements make no assumptions about the way in which LNP data may be distributed among multiple sets of LNP SCPs used by a single carrier.
21) The LRN SCP database will include a Facilities-Based Service Provider Identity associated with ported Directory Numbers. The Service Provider Identity is currently defined as a ~~numeric~~ alphanumeric value with a maximum of ~~8~~ 4 digits. ~~The form of the service provider ID is still under study. See section 4.1.3 of the ICC NPAC/SMS RFP Document.~~[7]
22) These requirements assume that an LNP GTT function is supported somewhere in the service provider's network. The LNP GTT function could be supported in an STP, SCP, or other suitable platform. It is assumed that SS7 translations throughout the provider's network are configured to route SS7 messages requiring the LNP GTT function to the system performing the LNP GTT function.
23) If a single platform supports both the SCP LNP Application and the LNP GTT function, then addressing resource and capacity conflicts between the two functions is a matter to be resolved between service providers and their vendors, and is not addressed by this document.[8]

Miscellaneous Coding and Routing Items

24) The DN value sent in the LNP query must be 10 digits.
25) The "ported number" GAP shall always be populated with the full ten digits of the ported number.
26) A new LNP translation type (SS7 SCCP) can be provisioned for LNP queries and can be different from other AIN or IN queries. A separate LNP translation type must be used to differentiate between IN LNP and AIN LNP queries within the same network. Differentiating between AIN and IN LNP queries is necessary so the SCP can invoke the proper error procedures, which differ between IN and AIN. (Differentiating between IN and AIN LNP queries may also be necessary to manage IN and AIN ACG processes independently.)
27) LNP Triggers are not expected to be placed on Service Codes (e.g., 411) or Service Access Codes (e.g., 800).
28) The LNP SCP database is expected to record aggregate counts for LNP queries in an appropriate format, suitable for billing purposes. See Section 4.8.4 for specific billing requirements.
29) These requirements assume that SS7 translations in the SSP and STP are configured to route LNP queries to the LNP SCP containing data to process the specific LNP query.
30) There have been no requirements for recording GTT processing for billing purposes to date.
31) It is assumed that no changes to SS7 Gateway Screening requirements (GR-82-CORE, Appendix C) are necessary to support LNP. Any interactions between existing Gateway Screening capabilities and LNP are not addressed by this document.

[7] Item from Bellcore comments dated September 23, 1996.

[8] From Issue #12 (Interactions between GTT congestion & LNP application)

At this time, no need for Gateway Screening following the LNP GTT has been identified.[9]

32) The interactions between ACG procedures, various SCP deployment configurations (mated pairs, N+1), different SS7 addressing methods (point code, capability code), and traffic balancing methods (load sharing, primary/secondary routing) are not addressed by this document. These issues are left to each carrier to resolve based on their specific network architecture and system capabilities.[10]

33) The possible interactions between ACG procedures for AIN LNP triggers, IN LNP triggers, and LIDB controls may vary based on network architecture, and are not addressed by this document.[11]

34) ~~LIDB~~ Query messaging traffic controls (such as ACG for AIN and IN, and similar controls for LIDB queries) currently are often based upon six digits (NPA-NXX). Now that a given NPA-NXX may be shared among multiple providers, controls issued from one ~~LIDB system~~ SCP on an NPA-NXX basis may also restrict queries ~~to LIDB systems of~~ that affect other providers that ~~support~~ share the same NPA-NXX. Resolution of the multiple provider interactions of ~~LIDB~~ query messaging traffic controls is not addressed by this document.[12]

35) The definition of any requirements necessary to support OMAP message routing as a result of LNP impacts is for future study, and is not addressed by this document.[13]

36) The initial deployment of LNP will use Trigger Criteria values associated with the AIN 0.1 PODP trigger. An eventual migration to a unique Trigger Criteria value associated with the PODP-based LNP trigger is expected.[14]

1.4. Definitions and Acronyms

1.4.1. Acronyms

AC	Automatic Callback
AIN	Advanced Intelligent Network
AMA	Automatic Message Accounting
ANI	Automatic Number Identification (a.k.a. Billing Number)
ANSI	American National Standard Institute
AR	Automatic Recall
BAF	Bellcore AMA Format
BELLCORE	Bell Communications Research
CAC	Carrier Access Code
CAMA	Centralized Automatic Message Accounting
CdPN	Called Party Number

[9] From Issue #4 (Interactions between LNP GTT and gateway screening)

[10] From Issue #1 (ACG and various SCP deployment configurations)

[11] From Issue #2 (Interactions between different ACG procedures)

[12] From Issue #3 (Six digit LIDB ACG interactions among multiple providers), revised per comments from September 13, 1996 conference call. Also Bellcore comments dated September 23, 1996.

[13] From Issue #6 (Support of OMAP message routing)

[14] Issue #9 (new trigger criteria values for LNP trigger)

CDR	Call Detail Record
CgPN	Calling Party Number
CIC	Carrier Identification Code
CLASS[15]	Custom Local Area Signaling Services
CNAM	Caller ID with Name
CPE	Customer Premises Equipment
CSD	Circuit Switched Data
CSV	Circuit Switched Voice
DN	Directory Number
DNT	Dialed Number Trigger
DPC	Destination Point Code
FCI	Forward Call Indicator
GAP	Generic Address Parameter
GR	Generic Requirements
GTA	Global Title Address
GTT	Global Title Translation
IAM	Initial Address Message
IC	Interexchange Carriers
ICLATA	Intra-LATA Carrier Selection
IN	Intelligent Network
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
ISVM	Interswitch Voice Messaging
LATA	Local Access Transport Area
LEC	Local Exchange Carrier
LERG	Local Exchange Routing Guide
LIDB	Line Information Database
LNP	Local Number Portability
LRN	Location Routing Number
MDR	Message Detail Recording
MF	Multiple Frequency signaling
MWI	Message Waiting Indicator
NP	Number Portability
NPA	Numbering Plan Area
NPAC	Number Portability Administration Center
NXX	Office Code
OAM	Operations, Administration and Maintenance
OCN	Operating Company Number
OHD	Off-Hook Delay
OPC	Originating Point Code
OS	Operations Systems
OSPS	Operator Services Position System
PC	Point Code

[15] CLASS is a Service Mark of Bellcore.

PIC	Pre-subscribed Interexchange Carrier
PODP	3/6/10 Digit Public Office Dialing Plan Trigger
SCCP	Signaling Connection Control Part
SCP	Service Control Point
SDS	Specific Digit String Trigger (PODP is the term used for this document)
SLE	Screen List Editing
SMS	Service Management System
SOAC	Service Order Analysis and Control
SPID	Service Provider Identify
SS7	Signaling System 7
SSN	Subsystem Number
SSP	Service Switching Point
STP	Signal Transfer Point
TAT	Termination Attempt Trigger
TCAP	Transaction Capability Application Part
TT	Translation Type
WATS	Wide-Area Telephone Service

1.4.2. Definitions

Alias Point Code	See "Capability Code".
Capability Code	A SS7 address which is shared by more than one system supporting the same GTT function (or other SS7 function). Allows other systems to address the function generally, instead of needing to maintain the status of multiple separate point codes.
CLASS TCAP	TCAP messages used for the support of the CLASS features Automatic Recall, Automatic Callback, and Screening List Editing. These messages are passed between end offices to support these features.
CNAM TCAP	TCAP messages used to support the CLASS feature Caller ID with Name. These messages are passed between end offices and CNAM databases (SCPs). The messages are defined in TR-1188.
Conditional Trigger	The trigger is encountered after additional criteria is satisfied
Donor Switch	The switch the DN was initially ported from. More specifically, the switch that is considered the default destination for the NPA-NXX of the DN.
Default Routing	The ability of the switch to continue the call based on the dialed number when the SCP cannot be accessed due to abnormal circumstances.
End-User	Business or residential subscriber.

GTA (Global Title Address)	A "logical" or "virtual" address used for routing SS7 messages using the Signal Connection Control Part (SCCP) capabilities. To complete message routing, a GTA must be converted to a SS7 point code and subsystem number.
GTT (Global Title Translation)	Process by which a GTA is converted either into a SS7 point code and subsystem number (final GTT) or another SS7 destination which will perform the final GTT (non-final GTT or partial GTT).
IN Connect Message	The LNP response associated with the IN-based LNP trigger. Also known as a ConnectionControl:Connect message.
IN Start message	The LNP query associated with the IN-based LNP trigger. Also known as a ProvideInstructions:Start message.
Intra-LATA Portability	Providing number portability within a LATA.
Intermediate Switch	A tandem switch.
ISVM TCAP	TCAP messages used to support InterSwitch Voice Messaging capabilities (e.g., control of MWI). These messages are passed between messaging systems and end offices.
LATA	A defined geographic area where equal access switches or access tandem switches can provide carrier access to the local switch
LIDB TCAP	TCAP messages used to support Alternate Billing Services, OLNS, and GetData queries to the Line Information Database.
Line Served by Switch	Any Directory Number that is connected to the switch or subtends the switch. The DN may be a physical subscriber port or a virtual DN.
LNP Network	For purposes of this document, a network which can support telephone numbers ported to another network, as well as numbers ported into itself from another network, for circuit switched services.[16]
LNP Query	A request for call routing information sent from the SSP to the SCP when a call encounters an LNP trigger.
Location Portability	Allows the end-user to retain his/her DN after changing physical locations.
Location Routing Number	A 10-digit number used to uniquely identify a switch that has ported numbers.

[16] Errata list Item #5 (Errata List revised October 22, 1996)

Local Exchange Carrier (LEC) Routing	An intraLATA route where the route does not involve an Interexchange carrier. For this case, a IXC is neither dialed nor pre-subscribed. Typically, Feature Group C signaling is used for signaling the call out of the office.
LNP routing tables	Tables which route calls, based on called NPA-NXX, to the owner switch designated in the LERG. No specific implementation is implied by this term.
Non-involved Switch	A switch that does not have any number ported to/from it.
Non-LNP Capable Switch	A switch that does not have the capabilities described in this Generic Requirements document.
Non-Ported Number	A DN that may or may not be in a Portable NPA-NXX, but which has not been moved between switches
Operational User	The service provider's craft personnel.
Originating Switch	The switch where the call originates.
Point Code	Also "Signaling Point Code". Address that specifically identifies one system in a SS7 network.
Portable NPA-NXX	An NPA-NXX in which one or more DNs may have been ported.
Ported Number	A DN that has been moved from one switch to another where the switch may or may not be the same service provider.
Rate Center	The division of a switch into zones for billing purposes.
Recipient Switch	The switch the DN is ported to as defined by the LRN for the ported subscriber.
Service Portability	Allows an end-user to retain his/her DN after changing services, e.g. POTs to ISDN.
Service Provider Portability	Allows an end-user to retain his/her DN after changing service providers.
Signal Ported Number Trunk Group Option	Allows a trunk group to be provisioned to send the dialed number in the CdPN in lieu of sending the LRN in the CdPN and the Dialed Number in the GAP.
Wire Center	The location of one or more local switching systems. A point at which customer's loops converge.

1.5. References

Illinois Number Portability Workshop Generic Switching and Signaling Requirements for Number Portability, Issue 1.03, September 4, 1996

Illinois Commerce Commission Service Management System Request for Proposal (Commonly referred to as the "NPAC RFP")

ICC LNP NPAC Interface Requirements Document - ~~to be developed~~ reference to be determined

Illinois Number Portability Generic Operator Services Switching Requirements for Number Portability, Issue 1.1, June 20, 1996

[ICC LNP Operations & Maintenance Document - to be developed]

ANSI T1.112, "American National Standards for Telecommunication Signaling System No. 7 (SS7) Signalling Connection Control Part."

ANSI T1.113, "American National Standards for Telecommunication Signaling System No. 7 (SS7) Integrated Service Digital Network (ISDN) User Part."

GR-82-CORE, "Signal Transfer Point Generic Requirements", Issue 1, June 1994, Revision 3, December 1995 (Bellcore)

TR-NWT-000215, "CLASS^{SM} Feature: Automatic Callback", Issue 3, June 1993, (Bellcore)

TR-NWT-000220, "CLASS^{SM} Feature: Screening List Editing", Issue 3, December 1993, (Bellcore)

TR-NWT-000227, "CLASS^{SM} Feature: Automatic Recall", Issue 3, June 1993, (Bellcore)

GR-246-CORE, "Bell Communications Research Specification of Signalling System Number 7", Issue 1, December 1994, Revision 1, December 1995

TR-NWT-000533, "Database Services SSP Toll-Free Service", Issue 3, Supplement 1, April 1995 (Bellcore)

GR-606-CORE, "LSSGR Common Channel Signaling Section 6.5", Issue 1, June 1994, Revision 2, December 1995 (Bellcore)

GR-866-CORE, "ISDN Message Service Generic Requirements", Bellcore, Issue 1, July 1995

TR-NWT-001050, "Expansion of Carrier Identification Code Capacity for Feature Group D", Issue 1, April 1991 (Bellcore)

GR-1100-CORE, "Bellcore Automatic Message Accounting (BAF) Requirements", Issue 1, January 1995, Revision 3, April 1996

GR-1149-CORE, "OSSGR Section 10: System Interfaces", Issue 1, October 1995, (Bellcore)

TR-NWT-001188, "CLASS^{SM} Feature: Calling Name Delivery", Issue 1, December 1991, (Bellcore)

GR-1280-CORE, "AIN SCP Generic Requirements", Issue 1, August 1993 (Bellcore)

TR-NWT-001284, "Advanced Intelligent Network 0.1 Switching System Generic Requirements", Issue 1, August 1992 (Bellcore)

TR-NWT-001285, "Advanced Intelligent Network 0.1 Switch - Service Control Point Application Protocol Interface Generic Requirements", Issue 1, August 1992 (Bellcore)

GR-1299-CORE, "AIN SCP/Adjunct Interface Generic Requirements", Issue 3, July 1996 (Bellcore)

1.6. Credits

This document was edited by Wayne Heinmiller of Ameritech. Comments can be sent to "wayne.heinmiller@ameritech.com", or he can be called at 847-248-5415. This document is based substantially upon the LNP SSP document edited by Joe Lichter of Lucent. Thanks to all the members of the ICC LNP SCP Requirements Subcommittee (see listing in Annex B) for contributing text and providing guidance and review.

2. CUSTOMER PERSPECTIVE

2.1. End User Perspective (Human Interface)

The operation of Local Number Portability could impact the end-user even though end-user procedures are unchanged. There may be some feature limitations when the end-user changes their service to a different service provider. Some features previously used by the customer may not be supported by the new service provider's network. Also, some features may no longer work because they require an intra-switch or intra-network relationship with other users, that no longer exists once the customer changes to the new service provider.

The end-user will be responsible for initiating the porting of their service. He/She will have to request to change services and/or service providers and still retain his/her DN. The end-user will also have the option to retain his/her DN following a location move within the rate center.

The operation of the LNP Application residing in the SCP should be transparent to the end user. There is no direct interaction between the end-user and the LNP Application residing on the SCP.

2.1.1. Feature Overview

Number Portability (NP) gives the end-user the ability to move from one switch to another and keep their original Directory Number (DN). There are 3 types of Number Portability - Service Portability, Service Provider Portability and Location Portability.

1) Service Portability - allows an end user to retain his/her DN after changing services.
2) Service Provider Portability - allows an end user to retain his/her DN after changing

service providers.

3) Location Portability - allows an end user to retain his/her DN after changing physical locations. In this case, the subscriber may or may not change service providers. (Subscribers have generally enjoyed the ability to move within a rate center and/or wire center while keeping the same DN, because they could be served by the same switch. LNP does not change this capability. LNP Location Portability is generally viewed as addressing subscribers moving beyond their current rate center boundary.)

This feature will be based on AIN and/or IN. AIN signaling will follow the Bellcore AIN Release 0.1 protocol (TR-NWT-0001285)~~, with minor extensions drawn from GR-1299~~[17]. (TR-1285 has not been updated after it was issued. All corrections and clarifications for the material in TR-1285 have been incorporated in GR-1299.) This feature may use a new AIN trigger, which can support all three types of Number Portability. This feature does not preclude the use of IN triggers to access the LNP database. When IN is used, the signaling follows the message set defined for tollfree service in Bellcore TR-533, Supplement 1. The signaling for tollfree service is used to minimize the need to develop new message sets, etc., at an IN SSP to support LNP. As a result, various parameters are needed in the messages to satisfy the protocol but are not used by actual LNP processing

When a customer ports their service to a different service provider, while retaining their DN, the two service providers (old and new) supply information to the NPAC. This data about the customer's ported service is sent by the NPAC to the SCPs operated by service providers that serve that customer's LATA. The SCP LNP Application uses this information to respond to LNP queries it receives from the SSPs it serves.

When an NPA-NXX is defined as portable (the coordination of line assignments is outside the context of this feature), calls to that NPA-NXX will encounter an LNP trigger in an SSP. The SSP will send an LNP query to the LNP SCP.

The SCP LNP Application will look up the dialed DN, and if the number has been ported, the SCP will return a response including a Location Routing Number (LRN) of the recipient switch. ~~Depending on the type of LNP query that was received, the SCP may include a GAP (including the dialed number) and FCI parameter (indicating the LNP query has been encountered) in the response.~~ When the switch receives the LRN, the LRN will be used to route the call to its correct destination. The switch will use the received LRN to populate the ISUP IAM's Called Party Number parameter. The actual dialed digits (plus implied Area Code) are placed in the Generic Address Parameter (GAP) of the ISUP IAM. The Forward Call Indicator (FCI) parameter in the ISUP IAM will be used to indicate whether an LNP query was performed. The FCI parameter is used as a mechanism to prevent more than one LNP query from being launched on a call.

Queries for non-ported DNs will cause the SCP to return the actual dialed DN and not an LRN.

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[17] Text deleted per Issue #24 (Identify references to TR-1299 only when actually use material not in TR-1285)

† More deletions of material related to TAT-based trigger for LNP.

In this case, the SSP will route the call based on analysis of the dialed DN.

Switches that do not have LNP-SCP access capabilities will route the call to the donor switch or a tandem switch that has LNP-SCP access capabilities, and the donor or tandem switch will launch the query to determine routing.

The SCP LNP Application need not know whether the SSP generating the LNP query is the originating switch, an intermediate/tandem switch, or a terminating/donor switch.

Different SSPs may use different queries to access the LNP SCP. There are two acceptable LNP query formats that can be supported by SSPs. The different query formats are generated by two different LNP triggers that can be implemented by SSPs. The SCP LNP Application must be able to support the types of LNP queries generated by the SSPs it serves. The SCP LNP Application will be required to return the properly formatted response for each LNP query it receives, based on the format of the received query.

Use of the PODP-like trigger to provide LNP leaves the AIN Release 0.1 protocol unchanged; no new TCAP parameters are required in this case.

A number of services in use today rely upon SS7 signaling. These include LIDB (alternate billing services), CLASS, CNAM, and ISVM. Currently the SS7 network uses 6 digit GTT procedures (analysis of NPA-NXX) to route messages for these services to the target system. Once a given NPA-NXX is supported in multiple target systems, a GTT function based on 10 digit analysis will be needed to correctly identify the target system. This need is introduced for those services that are supported between networks that also support LNP. For those services that do not need to operate between LNP networks, 6 digit GTT procedures may continue to adequately support intra-network feature operation. The support of these features between networks is dependent upon bilateral business agreements. (Note: An LNP GTT function will be needed for support of intra-network features, regardless of inter-network agreements, if location portability beyond a wire center is supported.)

The following statements pertain to this feature and the AIN or IN capabilities specified in this document for the SCP LNP application and the GTT function:

- This feature specifies LNP query/response message formats based on one of the following LNP trigger types:
    - the 3/6/10 digit Public Office Dialing Plan (PODP) trigger.
    - the IN trigger currently used for tollfree service.
- LNP triggers are expected to be assigned in the switch on a six digit (NPA-NXX) basis. (A service provider may assign triggers on digit strings of other lengths if supported by the SSP.)
- The SCP LNP Application should not return "Continue" or "Send to Resource"[18] messages in response to LNP queries.

[18] Issue #33, (Clarify use of Continue and Sent to Resource messages.)

- This feature allows the SCP LNP application to include a Trunk Group parameter in an Analyze_Route response. If valid trunk group parameters are returned, the SSP will route the call to the specified trunk group. The use of this capability is not defined by this document.

- The network must support SS7 10 digit LNP GTT processing to enable the following services to work between LNP networks (depending on business agreements) for ported numbers:
  - CLASS Automatic Callback and Automatic Recall features
  - CLASS Screen List Editing (SLE)

- The network must support SS7 10 digit LNP GTT processing to support LIDB queries between LNP networks (depending on business agreements).

- The network must support SS7 10 digit LNP GTT processing to support Interswitch Voice Messaging - Message Waiting Indicator (ISVM/MWI) signaling, if the network uses SS7 to transport MWI between LNP networks (depending on business agreements).

- The network must support SS7 10 digit LNP GTT processing to support Calling Name (CNAM) signaling, if the network supports CNAM services between LNP networks (depending on business agreements).

- Location Routing Numbers (LRNs) will be provisioned to uniquely identify each switch that supports LNP. An LRN is not assigned to a customer; customers served by the same switch could all have the same LRN associated with their ported DN.

2.2. Service Provider Perspective

The following scenarios need to be facilitated:

- Provisioning the LNP data in the SCP in support of the LNP Application.
- Provisioning LNP GTT tables in the network.
- The service provider "A" customer ports his/her number to service provider "B."
- A customer in a Number Portability network discontinues his/her service.

There is a set of data which must be populated in the SCP in support of the LNP Application. This data includes information about users that have ported their numbers to different providers. The data indicates the LRN of the switch that serves each ported customer. This information is provided by the NPAC to the SCP LNP application via the local SMS.

There are two sets of data which must be provided in support of the LNP GTT function, for each service (LIDB, CLASS, CNAM, ISVM) which is supported between LNP networks. The first set of data represents 10 digit GTTs for subscribers that have ported their numbers. For ported customers in other LNP networks, this information is provided from the NPAC. (The NPAC will provide information for non-final GTT routing towards gateways in the other serving provider's network.) The service provider must provide the 10 digit GTT information for ported customers served within their own network. (The service provider must provide final GTT routing for ported customers served within their network.) The second set of data represents default GTT information based on six digits which serves those subscribers within a portable NPA-NXX that have not ported. The default GTT information is provided by a service provider's internal

processes.

2.2.1. Operational User

Operations personnel are responsible for providing the resources - administration, provisioning, maintenance and billing for customers who desire to change their current subscriber arrangement due to service, service provider, or location changes. This process should be as transparent as possible to the end-user with minimal disruption of service. The operations personnel or third-party administration will be responsible for updating the databases efficiently as numbers get ported.

2.2.2. Operational User Scenarios

The below description is provided as background information. Specific details will be determined by each service provider, or by the NPAC, as appropriate.

Provisioning of LNP Data
The data representing LRNs of ported users will be provided electronically from the NPAC to local SMS systems. The local SMS system must provide this data to the appropriate SCP LNP application.

Data representing gateway GTT (non-final) information for ported subscribers will also be provided electronically from the NPAC to local SMS systems. The local SMS system must provide this data to the appropriate LNP GTT function.

Data representing final GTT routing for ported subscribers within the service provider's network must be provided to the LNP GTT function by the service provider's own processes. (Note: This final GTT routing information provided by the service provider must have precedence over the gateway GTT information for the same user/DN provided by the NPAC. The service provider must have the capability to ensure the NPAC provided data does not "overwrite" the internally provided data for a given user/DN.)

Data representing default six digit GTT routing for non-ported subscribers within portable NPA-NXXs must be provided to the LNP GTT function by the service provider's own processes.

Provisioning Sequence for Porting Subscribers
To be determined by the ICC LNP Operations Subcommittee.

2.3. Call Flows

The following call flows are examples for illustration. The LNP trigger (and resulting query) may be encountered at various switches within the network. See the Generic Switching and Signaling Requirements for Number Portability document for a more complete list of the different locations within the network where the LNP trigger may be encountered. From the perspective of the SCP, there is no difference if the LNP trigger is encountered in the originating switch, terminating/donor switch, or intermediate/tandem switch.

the call should not proceed, as well as specifics on the parameter to be included in the CallerInteraction message, are to be determined by the service provider.

<OPT-370V1> (IN) The SCP LNP Application may support the IN Play Announcement message to direct the termination of call processing by the SSP.

The LNP will transmit the IN ACG message for purposes of traffic control. The conditions under which ACG shall be invoked and cleared are to be determined between the service provider and the vendor. For IN LNP triggers, ACG shall operate as defined in TR-533 for SCP overloads (Section 3.5.7.2 of TR-533) and SMS initiated controls (Section 3.5.7.4 of TR-533). IN ACG controls for calls to vacant code and non-purchased NPA (Section 3.5.7.1 of TR-533) do not apply for the LNP application. The applicability of mass calling controls (Section 3.5.7.3 of TR-533) is for future study.[44]

<REQ-380V1> (IN) The SCP LNP Application shall support the IN ACG message for traffic control as defined for SCP overload (Section 3.5.7.2 of TR-533) and SMS initiated controls (Section 3.5.7.4 of TR-533).[45]

4.3. LNP Global Title Translation Function

To support SS7 intersystem messaging for CLASS, LIDB, ISVM/MWI and CNAM, this LNP GTT Function must be available somewhere within the service provider's network. The same SCP that supports the SCP LNP Application may, at the service provider's option, also support this GTT function. The service provider may elect to have a different system (other than the SCP that supports the LNP Application) perform this function. In determining how to support the LNP GTT function within their network, the service provider should consider reliability and redundancy issues. If the service provider elects to perform this function elsewhere in their network, then the SCP that supports the LNP Application need not support the functions and data items identified in this section. The service provider will need to ensure that translations are appropriately configured in their SS7 network (STPs, SSPs) to route messages for portable NPA-NXXs to the system performing the LNP GTT function. The service provider need only support the GTT Function for the classes of SS7 TCAP intersystem signaling (CLASS, LIDB, ISVM/MWI, CNAM) supported by that service provider's network. For services that are supported only on an intra-network basis, performing GTTs on a six digit basis may be sufficient. The service provider will need to determine which services in their network require message routing using the LNP GTT function.

The LNP GTT function needs to be performed on SS7 messages originated within the service provider's network that are to be routed on a GTT basis where the NPA-NXX within the GTA represents a portable NPA-NXX. There appear to be at least three ways for systems within the service provider's network to route messages requiring the LNP GTT function to the system performing that function:

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[44] Issue #20 (specifics of ACG procedures to be implemented)

[45] Issue #20 (specifics of ACG procedures to be implemented)

1) The systems originating the messages may MTP address the messages directly to the system performing the LNP GTT function. (In this case, the system performing the LNP GTT function would also need to perform the GTT function on a six digit basis for non-portable NPA-NXXs as well.)
2) The systems originating the messages may MTP address the messages to a system that performs only a six digit GTT (e.g., an STP which currently performs six digit GTTs). The system performing the six digit GTT would selectively route (non-final GTT) messages with an SCCP Called Party Address representing a portable NPA-NXX to the system performing the LNP GTT function. (Routing to the system performing the LNP GTT function could be either by point code or capability code, depending on the preferences of the service provider, based on network management impacts.)
3) The systems originating the messages can MTP address the messages to a system that performs a six digit GTT. The system performing the six digit GTT would selectively route (final GTT) messages with an SCCP Called Party Address representing a portable NPA-NXX to the system performing the LNP GTT function. The LNP GTT function would be addressed by point code and subsystem number. In this case, the LNP GTT function would appear as an application. (Note: This approach appears to be feasible, but has SS7 network management implications, as well as implications on routing and correlating response messages that are not addressed in this document.)

The LNP GTT function must be able to perform non-final GTTs, and may also perform final GTTs, depending on the network configuration planned by the service provider. A service provider is expected to perform non-final GTTs for messages destined for other networks. If a service provider decides to also perform non-final translations at the LNP GTT function for messages relating to its own customers, then the provider must carefully plan the routing scheme within its SS7 network to avoid establishing circular routing of messages.[46]

The LNP GTT function also needs to be performed on SS7 messages received from other networks that are to be routed on a GTT basis where the NPA-NXX within the GTA represents a portable NPA-NXX.

The system that performs the LNP GTT Function may have one Point Code and one capability code. The capability code is a SS7 address that can be shared with other systems performing the LNP GTT Function. (See section 4.2.3.1 of GR-82-CORE.)

<REQ-390V1> (GTT) The system performing the LNP GTT Function shall support the ability to be assigned both a point code and a capability code.

The system performing the LNP GTT Function must support SCCP Routing procedures as defined in ANSI T1.112.4. When the system supporting the LNP GTT Function receives a SS7 message which is MTP addressed by a point code (or capability code) assigned to that system,

[46] Clarification requested by Bellcore comments dated September 23, 1996.

the SCCP Address Translation Type is recognized for CLASS, LIDB, ISVM/MWI, or CNAM, and the SCCP Called Party Address indicates to route on global title, the LNP GTT Function will invoke GTT procedures. Based on the Translation Type (TT) in the GTA, the LNP GTT Function will look for a matching 10 digit GTA value in the CLASS, LIDB, ISVM/MWI, or CNAM LNP data. If no match is found, "default" data based on NPA-NXX will be used to complete the global title translation. The use of "default" data based on NPA-NXX eliminates the need to keep 10 digit GTT data for numbers that are not ported. (Note: The system that performs the 10 digit LNP GTT and the system that performs the LNP default GTT could be different systems.)

<REQ-400V1> (GTT) The system performing the LNP GTT Function shall support SCCP Routing and Management procedures as defined in ANSI T1.112.4, including those for final global title translations, if final GTTs are supported.[47]

<REQ-410V1> (GTT) If the ten digit GTA matches the DN of a ported number, the LNP GTT Function shall perform the GTT indicated by the TT, using the data associated with the ported subscriber.

<REQ-420V1> (GTT) If the ten digit GTA does not match the DN of a ported number, the LNP GTT Function shall perform the GTT indicated by the TT, using the data associated with the default NPA-NXX.

If the system performing the LNP GTT Function is not an STP, then it should not be performing only MTP routing on received messages. In this case, it should only be receiving messages which require LNP GTT. To prevent "transit messages" from congesting the system if it is not an STP, it should perform MTP error procedures (see ANSI T1-111.4) if the MTP DPC of a received message does not match a PC assigned to the system performing the LNP GTT Function, or if the GTT indicates routing on point code.

<REQ-430V1> (GTT) If the system performing the LNP GTT Function is not also performing STP functions, it shall initiate error procedures (see ANSI T1-111.4) when it receives messages not MTP addressed to its point code or capability code, or if it receives messages which indicate SCCP routing is to be performed by point code.[48]

If the system performing the LNP GTT Function does not support other GTT functions, and if the TT does not match a translation type supported by that LNP GTT Function, then SCCP error procedures should be invoked (see ANSI T1-112.4.)

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[47] Clarification requested from September 13, 1996 conference call.

[48] Errata list Item #13 (Errata List revised October 22, 1996)

<REQ-440V1> (GTT) If the Translation Type in the received message is not supported by the system performing the LNP GTT Function, SCCP error procedures should be invoked (See ANSI T1-112.4.)

The LNP GTT function may only modify the SCCP Called Party Address SSN and Routing basis. The other fields within the SCCP Called Party Address, including GTA and TTN are not to be changed. The LNP GTT function should make no changes to the data within the fields of the SCCP Calling Party Address, or the TCAP portion of the message.[49]

<REQ-450V1> (GTT) The GTT function may only modify the contents of the SCCP Called Party Address SSN and Routing basis for messages that successfully complete GTT processing. Other fields of the SCCP Called Party Address (including GTA and TTN), all fields within the SCCP Calling Party Address, and the entire TCAP portion of messages that successfully complete GTT processing must be retransmitted without modification by the GTT function.[50]

Some networks may not support all the signaling services (LIDB, CLASS, CNAM, ISVM) supported by the GTT function. If a service is not supported by a service provider, the NPAC will download "null" data for the DPC and SSN fields associated with the non-supported service for the ported customer. This means there should be a ten digit entry for the ported customer in the GTT tables, but the DPC and SSN entries associated with the 10 digit entry will be "null". If the GTT function finds a ten digit match in the GTT tables, but the GTT data associated with the ten digit entry is "null", the GTT cannot be completed.[51]

<REQ-460V1 (GTT) If a 10 digit match is found for the GTA in the GTT table, but the GTT data associated for the indicated TTN is "null", it shall be treated as a non-existent translation, and the message return procedure shall be initiated. (See ANSI T1-112.4.)[52]

If the LNP GTT Function is unable to perform a GTT because the 10 digit DN does not match any entries in the 10 digit data of ported subscribers or 6 digit data for default NPA-NXXs, then the GTT cannot be completed.

<REQ-470V1> (GTT) If neither a 10 digit match is found in the LNP data, nor a six digit match is found in the default data, it shall be treated as a non-existent translation, and the message return procedure shall be initiated. (See ANSI T1-112.4.)

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[49] Issue #30 (clarify SCCP procedures for GTT function)

[50] Issue #30 (clarify SCCP procedures for GTT function)

[51] Issue #39 (null GTT procedures)

[52] Issue #39 (null GTT procedures)

4.3.1. LNP GTT for Ten Digit GTA

Ten digit GTA processing may be needed to route SS7 TCAP messages that support various services (examples include CLASS, ISVM/MWI, or CNAM . CLASS, ISVM/MWI and CNAM TCAP messages are currently distinguishable from each other based on Translation Type.

For these types of messages, a 10 digit GTA will represent a DN. The LNP GTT Function will identify which GTT tables to use (CLASS, ISVM/MWI, CNAM) based on the received TT. The LNP GTT Function should check the global title tables for the indicated TT for a ported DN entry that matches the 10 digit value of the GTA. If a match is found, the LNP GTT Function should use the GTT data associated with the found ported DN to formulate the outgoing SCCP.

4.3.1.1 Performing Final GTT For a Ported DN

If the GTT data associated with the ported line indicates a final translation (i.e., SSN entry is non-zero), the LNP GTT Function will repopulate the existing SCCP Called Party Address with the received GTA (10 digit DN) and SSN from the global title tables, and will include an indication that further SCCP routing is to be based on the DPC and SSN (non-zero) derived from the global title translation. It will retransmit the message with the repopulated SCCP Called Party Address, and an MTP DPC set to the DPC derived from the global title tables, and the MTP OPC of the LNP GTT Function itself.

4.3.1.2 Performing Non-Final GTT For a Ported DN

If the GTT data associated with the ported line indicates a translation that is not final (i.e., SSN entry is zero), the LNP GTT Function will copy the SCCP Called Party Address which contains the same GTA value that was received. (Since a non-final GTT is being performed, the SSN should be populated as zero.) The LNP GTT Function will indicate further SCCP routing is to be based on GTT. It will retransmit the message with the replicated SCCP Called Party Address, and an MTP DPC derived from the global title tables, and the MTP OPC of the LNP GTT Function itself.

4.3.1.3 Performing Final GTT For a Non-Ported DN

If no 10 digit match is found for the GTA in the translation tables, the LNP GTT Function should use the data in the default NPA-NXX table to route the message. If the default record for the NPA-NXX of the 10 digit GTA indicates a final translation to the final network element (i.e., SSN entry is non-zero), the LNP GTT Function will repopulate the SCCP Called Party Address which contains the received GTA (10 digits) and SSN from the default record, and that further SCCP routing is to be based on DPC and SSN (non-zero) derived from the translation. It will retransmit the message with the repopulated SCCP Called Party Address, and an MTP DPC set to the DPC derived from the global title tables, and the MTP OPC of the LNP GTT Function itself.

4.3.1.4 Performing Non-Final GTT For a Non-Ported DN

If no 10 digit match is found for the GTT in the translation tables, and the default NPA-NXX entry indicates a non-final translation (i.e., SSN entry is zero), the LNP GTT Function will copy the SCCP Called Party Address which contains the received GTA value . (Since a non-final

GTT is being performed, the SSN should be populated as zero.) The LNP GTT Function will indicate further SCCP routing is to be based on GTT. It will retransmit the message with the replicated SCCP Called Party Address, and an MTP DPC set to the DPC derived from the global title tables, and the MTP OPC of the LNP GTT Function itself.

4.3.2. LNP GTT for Six Digit GTA

Six digit GTA processing may be needed to route SS7 TCAP messages that support various services (examples include LIDB, CLASS, ISVM/MWI, or CNAM . LIDB, CLASS, ISVM/MWI and CNAM TCAP messages are currently distinguishable from each other based on Translation Type. At this time, all LIDB messages use six digit GTAs. Other message types may use six digit GTAs depending on capabilities and configurations of the service provider's network and systems.

Some systems only place six digits (NPA-NXX) in the SCCP GTA field. In this case, the LNP GTT Function cannot determine the subscriber DN to match from examination of SCCP data only. If the LNP GTT Function determines that the SSN and TT indicate a six digit GTA , then the LNP GTT Function must decode the TCAP portion of the message to determine the subscriber DN.

Once the DN has been retrieved from the TCAP portion of the message, processing continues as for the 10 digit LIDB GTA . If the received message included a GTA containing only six digits, the message as it is retransmitted from the LNP GTT function shall also have a GTA containing only six digits.

<REQ-480V1> (GTT) When a Translation Type indicates that 10 digit GTT processing should be performed and only six digits are present in the GTA, then the LNP GTT Function shall decode the TCAP portion of the message to determine a ten digit DN to use in place of the GTA for GTT processing.

A non-final translation for a ported number is given as an example. Upon receiving a six digit GTA , the LNP GTT Function will use the TT to identify the type of TCAP message (CLASS, LIDB, ISVM/MWI, or CNAM). The LNP GTT Function will decode the TCAP portion of the message to identify a 10 digit DN to use for the GTT. (See Section 4.6.4 for information about appropriate TCAP message formats.) The 10 digit value determined from the TCAP portion will be used in place of a 10 digit GTA in further GTT processing. If the GTT data associated with the 10 digit value indicates a translation that is not final (i.e., SSN is zero), the LNP GTT Function will copy the SCCP Called Party Address which contains the same GTA value that was received (six digits). (Since a non-final GTT is being performed, the SSN should be populated as zero.) The LNP GTT Function will indicate further SCCP routing is to be based on GTT. It will retransmit the message with the replicated SCCP Called Party Address, and an MTP DPC derived from the global title tables, and the MTP OPC of the LNP GTT Function itself.

If the LNP GTT function is unable to determine a ten digit DN value from the TCAP portion of the message, it shall treat the situation as an SCCP error, even though TCAP decoding was

attempted or performed. (See Section 4.5.) Also, if a match cannot be found for the DN retrieved from the TCAP portion in either the ten digit or six digit LNP data, it shall be treated as a non-existent translation, and the message return procedure shall be initiated. (See ANSI T1-112.4.)

<REQ-490V1> (GTT) If the message contains only a six digit GTA, and the LNP GTT function is unable to determine a ten digit DN value from the TCAP portion of the message, it shall treat the situation as an SCCP error, and initiate the message return procedure.

Note: The parameter containing the DN of the called party within the TCAP portion of the message may be part of a parameter "set". The sequencing of parameters within a "set" may vary, and cannot be guaranteed.

4.4. Operator Services Support Functions

The functions performed by Operator Systems which are impacted by LNP include:

- LIDB TCAP queries (calling card, billing validation, etc.)
- Routing Determination
- Busy Line Verification (BLV)
- Charge determination (Future)

The LNP GTT function defined in Section 4.3 will provide for the proper routing of LIDB TCAP queries initiated by an operator service system.

If the operator service system performs routing determination for calls to portable NPA-NXXs, it will need to query the SCP LNP application to determine the proper routing information (i.e., the LRN for a ported number, etc.). It will do so using any of the allowed LNP query messages (see Section 4.6.2.1). The SCP shall respond identically to LNP query messages initiated from operator service systems as it does for LNP query messages initiated from an SSP (see Section 4.2). (Note: Instead of performing the LNP query itself, an operator service system may route calls for portable NPA-NXXs to an LNP-capable SSP, which would perform the LNP query when appropriate.)

In order to perform Busy Line Verification (BLV), the operator service system will needs to know which network serves a particular directory number. For ported numbers, the operator service system will be able to use the LRN to identify the serving network. To determine whether a DN has been ported, and to determine the LRN for ported DNs, the operator service system will need to perform an LNP query when it attempts BLV for a DN within a portable NPA-NXX. It will do so using any of the allowed LNP query messages (see Section 4.6.2.1). The SCP shall respond identically to LNP query messages initiated from operator service systems as it does for LNP query messages initiated from an SSP (see Section 4.2). The operator service system will use the information returned in the response to determine if it can perform a BLV for the requested DN. If the operator service system determines from the response that it